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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

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AIR TRAFFIC.

By G. Sudre.

From "Premier Congrès International de
la Navigation Aérienne," Paris, November, 1921, Vol.I.

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AIR TRAFFIC.*

By G. Sudre.

Hardly had aviation emerged from the experimental stage, before France began to think of the improvement in international relations which should accrue from the conquest of the air. Nothing could better demonstrate this desire for general harmony than the attempt made in 1910 by the French government to conclude an international aerial convention.

This project, not meeting everywhere the same concurrence, was abandoned. It was renewed, this time with success, when the considerable development of aerial navigation during the war of 1914-18 necessitated, at the close of hostilities, the solution of a series of questions, which had yet hardly been touched.

As regards air traffic, it was necessary to establish general principles, according to which aircraft could circulate in their own country and pass from one country to another.

National Legislation.

This was the task undertaken by the convention for regulating air navigation, which was signed October 13, 1919, by the representatives of 27 governments. The exchange of ratification of this convention was delayed by the fact that the United States and Canada formulated certain reservations, which had to be examined.

* From "Premier Congrès International de la Navigation Aérienne," Paris, November, 1921, Vol. I, pp. 161-4.

On the other hand, a certain number of neutral countries requested, before giving their adhesion to this convention, that another protocol be added permitting, under certain conditions, derogations of article 5 of the convention of October 13, 1919, an article which obliged the contracting countries to forbid the circulation, above their territory, of the aircraft of non-contracting governments.

While awaiting the ratification of the convention, provisional agreements were made, on the basis of the principles contained in it, between France and England, France and Switzerland and are now being arranged between France, Holland and Spain. A *modus vivendi* has been established on the same principles between France and Belgium.

The work accomplished by the convention of October 13, 1919, was considerable, since it established the general principles and the scope of international aerial legislation and has consequently determined the interior legislation, which must harmonize with the clauses of this general "chart of the air."

The importance of this document necessitates a brief summary. After establishing a few principles of a general nature, the convention enunciates, in chapters I, II and III, the rules to follow regarding the nationality of aircraft, certificates of navigability and certificates of fitness of pilots. Chapter IV is devoted to air navigation over a foreign country and chapter V to the rules to be observed in starting, en route and in landing. Chapter VI treats of

forbidden shipments (explosives, arms, ammunition, etc.) and chapter VII of government aircraft. Lastly, chapter VIII institutes a permanent body, the "International Commission of Aerial Navigation," which is "placed under the authority of the Society of Nations." This introduces a principle of a more general order than that of most international agreements, which are simple compromises between various and often conflicting national interests. The convention of October, 1919, was thus an attempt to realize an aerial society of nations.

The convention of 1919 having established international bases for national legislation, the French Government was enabled to resume its project of May 7, 1913, which had been abandoned after the failure of the proposed international convention of 1910.

A new legislative bill, signed by the ministers of Foreign Affairs, Public Works, Interior, War, Navy and Finance was deposited March 25, 1920, on the desk of the Chamber of Deputies.

The principles laid down in the convention of 1919 were faithfully followed and the consequences deduced. The rules adopted before the war by the decree of December 16, 1913, and which inspired the legislative bill of the same year, were adapted to the new circumstances and conditions of aviation. This bill, after various amendments, was adopted by the Chamber of Deputies and is now before the Senate.

On the other hand, while awaiting the action of parliament, there was urgent need of harmonizing the French interior regula-

tions, contained in a decree of December 13, 1913, with the new exigencies of aerial locomotion, as well as with the international agreements already made.

French Interior Regulations.

The decree of July 8, 1920, responded to this need and laid down the general principles of aerial navigation in France. It left the details of regulation to a series of orders which appeared during the past year. These documents now constitute the French code of the air. A brief enumeration of the principal ones will sufficiently indicate the breadth and complexity of the problems studied, as well as the very advanced degree of organization already attained by air traffic in France.

Decree of August 9, 1920, regulating the employment of radio for protecting the flight of aircraft ("Journal Officiel," September 2, 1920; "Bulletin de la Navigation Aerienne" No. 7, October, 1920).

Decree of August 14, 1920, establishing the conditions for the issuance of certificates of navigability for aircraft ("Journal Officiel," August 14, 1920; Bulletin No. 6, September, 1920).

Decree of August 14, 1920, fixing the registration rules for aircraft and the distinctive marks to be borne by them ("Journal Officiel," August 14, 1920; Bulletin No. 6, September, 1920).

Decree of August 26, 1920, regulating air travel, beacons and signals ("Journal Officiel," August 29, 1920; Bulletin No. 6, September, 1920).

Decree of September 18, 1920, relating to licenses for civilian

pilots ("Journal Officiel," September 24, 1920; Bulletin No. 7, October, 1920).

Decree of September 30, 1920, establishing the rules to follow in keeping books on aircraft ("Journal Officiel," October 5, 1920; Bulletin No. 8, November, 1920).

Decree of January 12, 1921, establishing the customs regulations to be observed by aircraft landing in or leaving France ("Journal Officiel," January 18, 1921; Bulletin No. 11, February, 1921).

Decree of June 10, 1921, abrogating previous dispositions relating to zones forbidden to aerial navigation ("Journal Officiel," June 23, 1921).

Decree of June 10, 1921, regulating the transportation and use of photograph and kinetagraph cameras on aircraft ("Journal Officiel," June 23, 1921).

Decree of August 23, 1921, doing away with the medical examination for the license of the pilot of a touring airplane ("Journal Officiel," August 25, 1921).

Inspection of Aircraft and Pilots.

Lastly, a certain number of departmental documents have determined the application of these decrees, as regards the supervision to be exercised over the pilot and aircraft, as well from the professional and technical point of view, as from the physical and material.

Thus the instructions of August 31, 1920, fixed the technical

conditions to be fulfilled by aircraft for the obtention of navigability certificates. The instructions of September 18 and 28, 1920, fixed the professional and medical conditions to be fulfilled for the issuance, use and renewal of the licenses of civilian air pilots.

The above-mentioned decrees appeared in the "Journal Officiel" of the French Republic. All the supplemental instructions were published in the "Bulletin officiel de la Navigation Aérienne." These documents together give to aerial navigation the administrative regulations, in accordance with which it is expected to develop normally.

It was evidently necessary to regulate and coordinate carefully all improvements in aviation, in their various manifestations, in order to avoid, in this branch of the industry which represents both mobility and speed any scattering of energy and anarchic incoherence and the consequent sterility of efforts and arrest of progress.

It must not however be forgotten that any regulation is beneficial only in so far as it is limited to the efficacious and discrete role of the internal framework, the invisible and robust skeleton of a living organism. It is a common characteristic of all fond and anxious mothers to fear all outside contact for their young children and the French government which, it must be confessed, is bending over the new-born Aviation with a passionate solicitude, has not been able to escape it entirely. It is thus that, as regards the customs regulations, the obligations of the technical supervision of the material and the conditions of the medical or professional exam-

inations, certain requirements could be ameliorated without any real disadvantage. May the professional "regulator" be permitted to utter a vow not to regulate matters of the air with excessive prudence. In such matters, the regulations of today are liable to become a dead weight by tomorrow and weight is the enemy of the airplanes.

Statistics.

The development of air traffic is followed and confirmed by a monthly statement of the traffic of the French air lines in operation and a monthly report of accidents for each aerial navigation company. These statistics cover, for each line, the number of

- a) Trips scheduled, trips completed and trips partially completed;
- b) Kilometers flown;
- c) Paying passengers;
Non-paying passengers;
- d) Kg of freight carried;
- e) " " mail " ;
- f) Fatal accidents,
Accidents causing injuries,
Accidents causing only material damages.

From January 1, to September 15, 1921, the statistics for the French aerial navigation companies are:

- 1,617,119 km flown;
- 8,068 passengers and 113,621 kg freight and mail carried;
- 4 fatal accidents;
- 8 accidents causing injuries only.

Insurance.

The matter of insurance in aerial navigation at present leaves much to be desired.

Since November 1, 1919, the French companies have combined in a "consortium" for carrying aerial transportation risks. The premiums in force are unfortunately high, the companies desiring to protect themselves amply, in new forms of insurance, against risks little known as yet. In fact, up to the present time, statistics have pertained chiefly to war risks. The mean risk of commercial aviation can only be determined after about two years of general and carefully collected statistics. We have seen that such statistics have already been kept for several months.

Insurance rates will be greatly reduced when the "Bureau Veritas" completes the task it has undertaken of establishing an airplane register, similar to that of the English Lloyd for ships.

Translated by the National Advisory Committee for Aeronautics.



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1. The first part of the report is devoted to a review of the

literature on the subject of the effect of the magnetic field on the
rate of reaction between a gas and a solid surface. It is found that
the rate of reaction is generally increased by the presence of a
magnetic field, and this effect is more pronounced at higher pressures
and lower temperatures. The mechanism of this effect is not yet
fully understood, but it is believed to be due to the alignment of
magnetic moments on the surface of the solid, which leads to a
higher probability of successful collisions between the gas molecules
and the surface atoms. The effect is also observed in the case of
catalytic reactions, where the magnetic field can significantly
increase the rate of reaction. The second part of the report
describes the experimental work carried out to study the effect of
the magnetic field on the rate of reaction between carbon monoxide
and a solid surface. The results show that the rate of reaction is
increased by the presence of a magnetic field, and this effect is
more pronounced at higher pressures and lower temperatures. The
mechanism of this effect is discussed in the third part of the
report.

The third part of the report describes the experimental work carried out to study the effect of the magnetic field on the rate of reaction between carbon monoxide and a solid surface.